APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,692	03/02/2006	Jingxin Liang	CN 020047	8973

65913   7590   10/29/2007

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EXAMINER
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ART UNIT	PAPER NUMBER
2618	

NOTIFICATION DATE	DELIVERY MODE
10/29/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>02 March 2006</u>.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-10</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-3 and 6-10</u> is/are rejected.

7)☐ Claim(s) <u>4-5</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>06-24-2005</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All b)☐ Some * c)☐ None of:

        1.☒ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1.   The information disclosure statement (IDS) submitted on 03-02-2006, the information

disclosure statement has been considered by the examiner.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

3.   Claims 1-3, 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gotze et

al. (EP 0971485 A1).

        Regarding claim 1, Gotze teaches multi-user detection and de-correlation method in TD-

CDMA multi-user detection charactericed (see page 3, paragraph [0015]) in that is comprises: a.

Receive wireless symbols S or R (see fig. 3, symbols S and R, page 2, paragraphs [0007 and

0009]); b. Obtain a channel correlation matrix (S) (see page 3, paragraphs [0010 and 0012]), take

one part from R and get a partial correlation matrix R.sub.P (see page 4, paragraph [0017]); c.

Do inversion operation to the partial correlation matrix R.sub.P, then obtain matrix V.sup.(m)

(see paragraph [0009]); d. Recover original data symbols D from received symbols S by

V.sup.(m) that the to location of original data symbols D corresponds to (see paragraph [0012-

0013] and page 5, paragraphs [0023, 0028, 0031]). That is obvious to a simplified de-correlation method in TD-SCDMA.

Therefore, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify above teaching of Gotze, in order to provide a radio communications receiver which operates to detect radio signals and to recover data representative of the radio signal in presence detected interfering signals (see abstract lines 1-4).

Regarding claim 2, Gotze teaches A simplified de-correlation method in TD-SCDMA multi-user detection of claim 1, characterised in that said partial correlation matrix $R_{.sub.P} = \{r_{.sub.i,j}\}$, $i,j = 1 \ldots (2P+1)K$, the partial correlation matrix $R_{.sub.P}$ is submatrix of channel correlation matrix R on diagonal, the K is the user number in one time slot, wherein said P is the symbols number earlier than or latter than current symbols and have influence to current symbols (see paragraphs [0036-0047]).

Regarding claim 3. Gotze teaches A simplified de-correlation method in TD-SCDMA multi-user detection of claim 2, characterised in that said $V_{.sup.(m)} = \{v_{.sub.i,j.sup.m}\}$, wherein $v_{.sub.i,j.sup.(m)} = (R_{.sub.P.sup.-1})_{.sub.1+(m-1)K,j}$, $i=1 \ldots K, j=1 \ldots (2P+1)K, m=1 \ldots 2P+1$ (see paragraphs [0022-0035]).

Regarding claim 6. Gotze teaches a simplified de-correlation method in TD-SCDMA multi-user detection characterised in that the $1_{.ltoreq.}K_{.ltoreq.}16$ (see page 4-5, paragraphs [0017-0031]).

Regarding claim 7. Gotze teaches characterised in that the P is integer, the N is 22 (see page 8, paragraphs [0042-0043]). In this case, P=V=2 and the element R of 22.

Regarding claim 8. Gotze teaches characterised in that the P is 2 (see page 8, paragraphs [0041-0043]). In this case, P=V=2.

Regarding claim 9. Gotze teaches a UE system (10) in TD-CDMA characterised in that is (see fig. 1-2) comprises: a correspond calculate equipment to define the partial correlation matrix $R_{.sub.P}$; a draw out and inversed matrix equipment to define new matrix $V^{.sup.(m)}$ (see (see page 2, paragraphs [0007-0009]); and a matrix-vector multiplication to multiply received wireless symbols S by said matrix $V^{.sup.(m)}$ (see page 3, paragraphs [0010-0012] and page 5-6, paragraphs [0023 and 0030-0031]). That is obvious to a simplified de-correlation method in TD-SCDMA.

Therefore, it would have been obvious to one of ordinary skill in the art at the time invention was made to modify above teaching of Gotze, in order to provide a radio communications receiver which operates to detect radio signals and to recover data representative of the radio signal in presence detected interfering signals (see abstract lines 1-4).

4.   Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gotze et al. (EP 0971485 A1) in view of Huang (U.S. Patent No. 6,370,129).

Regarding claim 10, Gotze does not mention the a UE system in TD-SCDMA

characterised in that is also comprises K matching filters and K buffer storages which connected

correspond to the matching filter one by one.

However, Huang teaches the a UE system in DS/CDMA characterised in that is also

comprises S matching filters and K buffer storages which connected correspond to the matching

filter one by one (see fig. 6. matching filters S (620-1 and 620-P) and channel combinet C1 (630-

1 and 630-P), col. 12, lines 50-67, col. 25, lines 1-60).

Therefore, it would have been obvious to one of ordinary skill in the art at the time

invention was made to modify above teaching of Gotze with Huang, in order to remove

interference and reducing the complexity (see suggested by Huang on col. 25, lines 39-42 and

lines 55-57).

Allowable Subject Matter

5.   Claims 4-5 are objected to as being dependent upon a rejected base claim, but would be

allowable if rewritten in independent form including all of the limitations of the base claim and

any intervening claims.

Reasons for allowance

6.   The following is an examiner's statement of reasons for allowance:

Regarding dependent claims 4-5, Gotze teaches multi-user detection and de-correlation

method in TD-CDMA multi-user detection charactericed (see page 3, paragraph [0015]).

However, Gotze alone or in combination with other prior art of record, fail to disclose A

simplified de-correlation method in TD-SCDMA multi-user detection of claim 1, characterised

in that the location of original data symbols D have three situation: 1) when 1.ltoreq.n.ltoreq.P,

V.sup.(m)=V.sup.(n), D.sup.(n) can be recovered as {circumflex over

(D)}.sup.(n)=V.sup.(n)S.sub.P.sup.(n) 2) when P+1.ltoreq.n.ltoreq.N-P, V.sup.(m)=V.sup.(P+1),

D.sup.(n) can be recovered as {circumflex over (D)}.sup.(n)=V.sup.(P+1)S.sub.P.sup.(n) 3)

when N+1-P.ltoreq.n.ltoreq.N, V.sup.(m)=V.sup.(2P+1+n-N), D.sup.(n) can be recovered as

{circumflex over (D)}.sup.(n)=V.sup.(2P+1+n-N)S.sub.P.sup.(n), said {circumflex over

(D)}.sup.(n) is the estimation of original symbol, said n is location of chip as specified in

dependent claim 4.

    And A simplified de-correlation method in TD-SCDMA multi-user detection of claim 1,

characterised in that: When P+1.ltoreq.n.ltoreq.N-P, received wireless symbols S can be defined

as S P (n) = (s 1 (n - P) , s 2 (n - P) , .times. , s K (n - P) n - P th .times. symbols .times.

.times. of .times. .times. all .times. .times. K .times. .times. users , .times. , s 1 (n) , s 2 (n) ,

.times. , s K (n) n th .times. symbols .times. .times. of .times. .times. all .times. .times. K .times.

.times. users , .times. , s 1 (n + P) , s 2 (n + P) , .times. , s K (n + P) n + P th .times. symbols

.times. .times. of .times. .times. all .times. .times. K .times. .times. users) ,wherein, said

s.sub.1.sup.(n-P), s.sub.2.sup.(n-P), . . . , s.sub.k.sup.(n-P) is (n-P).sup.th symbols of all K users,

said s.sub.1.sup.(n), s.sub.2.sup.(n), . . . , s.sub.k.sup.(n) is (n).sup.th symbols of all K users, said

s.sub.1.sup.(n+p),s.sub.2.sup.(n+p), . . . ,s.sub.k.sup.(n+p) is (n+P).sup.th symbols of all K users;

When 1.ltoreq.n.ltoreq.P, received wireless symbols S can be defined as S P (n) = (s 1 (1) ,

.times. s 2 (1) , .times. .times. , .times. s K (1) 1 st .times. .times. symbols .times. .times. of .times.

.times. all .times. .times. K .times. .times. users , .times. .times. , .times. s 1 (n) , .times. s

2 (n) , .times. .times. , .times. s K (n) n th .times. .times. symbols .times. .times. of .times.

.times. all .times. .times. K .times. .times. users , .times. .times. , .times. s 1 (2 .times. .times. P +

1) , .times. s 2 (2 .times. P + 1) , .times. .times. , .times. s K (2 .times. P + 1) 2 .times. P + 1 th

.times. .times. symbols .times. .times. of .times. .times. all .times. .times. K .times. .times. users)

Here, said s.sub.1.sup.(l),s.sub.2.sup.(l), . . . ,s.sub.k.sup.(l) is 1.sup.th symbols of all K users,

said s.sub.1.sup.(n),s.sub.2.sup.(n), . . . ,s.sub.k.sup.(n) is (n).sup.th symbols of all K users, said

s.sub.1.sup.(2P+1),s.sub.2.sup.(2P+1), . . . ,s.sub.k.sup.(2P+1) is 2P+1.sup.th symbols of all K

users; When N+1-P.ltoreq.n.ltoreq.N, received wireless symbols S can be defined as S P (n) = (

s 1 (N - 2 .times. P) , .times. s 2 (N - 2 .times. P) , .times. .times. , .times. s K (N - 2 .times. P)

N - 2 .times. P th .times. .times. symbols .times. .times. of .times. .times. all .times. .times. K

.times. .times. users , .times. .times. , .times. s 1 (n) , .times. s 2 (n) , .times. .times. , .times. s

K (n) n th .times. .times. symbols .times. .times. of .times. .times. all .times. .times. K .times.

.times. users , .times. .times. , .times. s 1 (N) , .times. s 2 (N) , .times. .times. , .times. s K (N)

N th .times. .times. symbols .times. .times. of .times. .times. all .times. .times. K .times. .times.

users) wherein, said s.sub.1.sup.(N-2p),s.sub.2.sup.(N-2p), . . . ,s.sub.k.sup.(N-2p), is N-

2p.sup.th symbols of all K users, said s.sub.1.sup.(n),s.sub.2.sup.(n), . . . ,s.sub.k.sup.(n), is

n.sup.th symbols of all K users, and said s:sub.1.sup.(N),s.sub.2.sup.(N), . . . ,s.sub.k.sup.(N),is

N.sup.th symbols of all K users as specified in dependent claim 5.

Conclusion

7.   **Any response to this action should be mailed to:**

> Commissioner of Patents and Trademarks
> Washington, D.C. 20231

or faxed to:

(571) 273-8300, (for Technology Center 2600 only)

*Hand-delivered responses should be brought to the Customer Service Window (now located at the **Randolph Building, 401 Dulany Street, Alexandria, VA 22314**).*

8.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tan Trinh whose telephone number is (571) 272-7888. The examiner can normally be reached on Monday-Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiners supervisor, Anderson, Matthew D., can be reached at (571) 272-4177.

The fax phone number for the organization where this application or proceeding is assigned is **(571) 273-8300**.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the **Technology Center 2600 Customer Service Office** whose telephone number is **(703) 306-0377**.

9.   Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tan H. Trinh
Division 2618
October 17, 2007

PATENT EXAMINER
TRINH,TAN